

REMARKS

The case was filed with 52 claims. As a result of restriction and election requirements which had been made final by the examiner, claims 1-28, 37-48, 50 and 52 have been withdrawn by examiner for further consideration. Claims 29-36, 49 and 51 remain in the case and are rejected.

THE INVENTION

The invention defined in the claims in accordance with the Preliminary Amendment filed May 1, 2003 defines as in claim 29 producing a first portion of vaporized water and a second portion of vaporized water. The first portion of vaporized water is prepared by heating a first water stream in a preferential oxidation reactor to form the first portion of vaporized water. The second water stream is heated in a vaporizer to form the second portion of vaporized water. Then, the first and second portions of the vaporized water are mixed together and then mixed with an air supply stream to regulate the temperature of reformat gas. (See independent claim 29.) Further, after such mixed stream moderates the temperature of reformat gas leaving the reformer, such mixed stream is then supplied for reaction within the autothermal reformer. (See claim 30.) The relative amounts of the first and second portions are set forth. (See claim 31). The temperature of the preferential oxidation reactor is set forth. (See claim 32.) Regulation of pressure of the steam stream is set forth. (See claim 33.) The regulation of the two water streams flow rate with regard to demand as set forth.

(See claim 34.) The regulation of the vaporizer capacity is set forth (see claim 35) and the regulation of the fuel supply with respect to demand is set forth. (See claim 36.) The type of vaporizer is set forth in claim 49 and in claim 51 the vaporized portions relative to the water supply stream is set forth.

It is respectfully submitted that the combination of the art of record does not suggest any of the aforesaid features of independent claim 29 or dependent claims 30-36, 49 and 51.

REJECTION OF CLAIMS UNDER 35 U.S.C. §103

Claims 29-36, 49 and 51 were rejected under 35 U.S.C. §103(a) as being unpatentable over Aoyama (USPN 6,290,913) in view of Hwang et al. (USPN 4,522,894).

Aoyama is said to disclose a method for producing hydrogen which includes reacting water and fuel in a reformer to produce a reformat which is then passed to a preferential oxidation reactor. It is stated that Aoyama shows at least a portion of the water used in the reformer is pre-heated in the prox reactor.

It should be noted that Aoyama does not use the term preferential oxidation reactor. Rather Aoyama defines a CO selective oxidizing unit. It is not necessarily the case that Aoyama's CO oxidizing unit and the preferential oxidizer reactor of the present application are the same.

It should be noted that a more careful reading of Aoyama discloses that a water stream is mixed with a methanol stream. Then, the mixed stream of fuel and water is passed for preheating through the CO oxidizing unit.

Therefore, Aoyama does not disclose preheating of a water stream in a prox reactor.

It is admitted in the Office Action that Aoyama does not disclose a reactor in the form of an auto-thermal reformer, and Aoyama does not disclose that air is mixed with water supply before entering the reformer. It is further admitted that the reference does not disclose a second water stream being preheated in a combustor and mixed with the second portion of water preheated in the prox.

It is important to note that the present claims recite the second water stream is heated in a vaporizer. In the present claims, the second water stream is heated in a vaporizer to form vaporized water.

Hwang figure 2 is cited to show an auto thermal reformer and cited to show the preheating of water which is mixed with air before entering a reformer where such preheating is accomplished in a combustor.

It is respectfully submitted that a careful reading of the present claims reveals that the second water stream of the present invention is heated in a vaporizer to form a vaporized stream.

Hwang does not teach the preheating of water in a combustor as stated in the Office Action or in a vaporizer associated with a combustor as in the present invention.

Hwang does not show a vaporizer. Hwang shows a combustor used only for preheating air and hydrocarbon feed. Hwang does not heat water using a combustor or a vaporizer.

Hwang heats water using thermal output from the auto thermal reformer. There is no teaching in Hwang of heating water with preferential oxidizer effluent.

It can be seen that Aoyama and Hwang are not combinable because Aoyama teaches heating a mixed fuel and water single input stream to the reformer using a CO oxidizing unit; whereas Hwang teaches heating a single input water stream for the reformer using thermal energy of the reformer itself.

Thus, Aoyama teaches that water is mixed with the fuel and then heated. Hwang teaches heating water alone, then mixing it with air. Thus, Hwang and Aoyama are clearly not combinable and both are different from the present invention.

Hwang and Aoyama alone or in combination do not teach preheating two water portions, one in the prox and the other in a vaporizer; and then mixing such two portions together, and with air, for heat exchange with reformat gas.

For the reasons given above, it would not be obvious to one of ordinary skill in the art to combine Hwang and Aoyama to arrive at applicant's invention.

In summary, Aoyama and Hwang are different systems; show preheating of water in a different way; one shows preheating of water in a combined stream of the fuel and water, the other shows preheating of water done alone. Neither reference shows or suggests preheating of a first water portion with a prox reactor; a second water portion

with a vaporizer or a vaporizer associated with the heat of a combustor; and subsequent further heating of both water portions with reformat gas heat exchange.

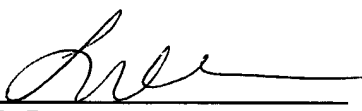
Given the deficiencies of the two references and the different arrangements of the two references, they are not combinable and they do not suggest the features of the present invention. It is respectfully submitted that the present claims are patentable over Aoyama in view of Hwang.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this Response to the Office Action is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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